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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,446	09/18/2003	Takatomo Nishino	09792909-5672	4529

26263

7590

09/24/2010

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EXAMINER

DOVE, TRACY MAE

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

09/24/2010

PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* TAKATOMO NISHINO, HIROAKI TANIZAKI and  
HIROSHI INOUE

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Appeal 2009-007653  
Application 10/664,446  
Technology Center 1700

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Before SALLY G. LANE, MICHAEL P. TIERNEY, and  
JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

ROBERTSON, *Administrative Patent Judge*.

DECISION ON APPEAL<sup>1</sup>

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<sup>1</sup> The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or for filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the “MAIL DATE” (paper delivery mode) or the “NOTIFICATION DATE” (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

### STATEMENT OF THE CASE

Appellants seek our review under 35 U.S.C. § 134 of the Examiner's final decision rejecting claims 1-12. We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We AFFIRM.

### BACKGROUND

Appellants' invention is directed to an anode material for a battery comprising a base material physically bonded by van der Waals forces to a carbonaceous material. (Spec. 5, 6.)

Claim 1 is illustrative:

1. An anode material, comprising: a composite material including a base material physically bonded by van der Waals forces to a carbonaceous material, the base material including at least one element selected from the Group 14 elements, except for carbon (C), the physical bonding of the base material to the carbonaceous material effected by applying a compressive force and a shearing force to at least a part of a surface of a base material when the composite material is formed.

(App. Br. 11, Claims Appendix.)

Appellants appeal the following rejections:

1. Claims 1-12 under 35 U.S.C. § 102(b)/103(a) as being anticipated by, and alternatively obvious over Kawakami (US 6,432,585 B1, issued Aug. 13, 2002);
2. Claims 1, 3-7, and 9-12 under 35 U.S.C. § 102(b)/103(a) as being anticipated by, and alternatively obvious over Suzuki (US 6,413,672 B1, issued July 2, 2002) (hereinafter "Suzuki '672");
3. Claims 1, 4, 5, 7, 10, and 11 under 35 U.S.C. § 102(b)/103(a) as being anticipated by, and alternatively obvious over Suzuki (US 6,171,725 B1,

issued Jan. 9, 2001) (hereinafter “Suzuki ‘725”); and

4. Claims 1-12 under 35 U.S.C. § 102(e)/103(a) as being anticipated by, and alternatively obvious over Inoue (US 6,506,520 B1, issued Jan. 14, 2003).

### APPELLANTS’ CONTENTIONS

Appellants contend that the Examiner improperly interpreted claims 1 and 7 as reciting product-by-process limitations. (App. Br. 7.) Appellants argue that in the event claims 1 and 7 are interpreted as reciting product-by-process limitations, the phrase “effected by applying a compressive force and a shearing force to at least part of a surface of a base material when the composite is formed” imparts the structural characteristic of physical bonding which results in improved cycle characteristics in the recited composite material. (App. Br. 7-8.) Appellants argue that none of the cited prior art discloses or suggests the improved cycle characteristics as a result of the recited application of forces. (App. Br. 8-9.)

### ISSUES

1. Does the claim phrase “the physical bonding of the base material to the carbonaceous material effected by applying a compressive force and a shearing force to at least a part of a surface of a base material when the composite is formed” qualify as product-by-process language?

2. Do Kawakami, Suzuki ‘672, Suzuki ‘725, and Inoue disclose or suggest the recited anode material including a base material physically bonded by van der Waals forces to a carbonaceous material by virtue of the mixing steps disclosed in each reference?

## PRINCIPLES OF LAW

[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in a product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

*In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985) (internal citations omitted).

“Where a product-by-process claim is rejected over a prior art product that appears to be identical, although produced by a different process, the burden is upon the applicants to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product.” *In re Marosi*, 710 F.2d 799, 803 (Fed. Cir. 1983).

## FACTUAL FINDINGS

The record supports the following additional findings of fact (FF) by a preponderance of the evidence.

1. Appellants’ Specifications states “[i]t is considered that when a compressive force and a shearing force are applied to combine the carbonaceous material, the base material and the carbonaceous material are brought nearest to each other, and are physically bonded by van der Waals forces, thereby the composite material is formed.” (Spec. 6.)
2. Appellants’ Specification states “the composite material is formed through applying a compressive force and a shearing force so as to combine the carbonaceous material with the base material, so

unlike the case where the base material and the carbonaceous material are simply mixed . . . the carbonaceous material is firmly adhered to the base material, thereby a decline in the cycle characteristics by the base material can be prevented by the carbonaceous material.” (Spec. 5.)

3. Appellants’ Specification, while describing an apparatus for applying a compressive force and a shearing force to at least a part of a surface of a base material when the composite is formed, does not provide any range of compressive or shearing forces required to achieve the physical bonding by van der Waals forces. (Spec. 9, Fig. 1.)
4. Kawakami discloses a battery including an electrode having a composite material in which a carbonaceous material is mechanically mixed with a metallic material using a ball mill. (Col. 1, ll. 8-23; col. 12, l. 56 – col. 13, l. 5.)
5. Suzuki ‘672 discloses a battery including an anode where silicon powder is uniformly mixed with graphite in a vibration mill. (Col. 8, ll. 33-51.)
6. Suzuki ‘725 discloses a battery including an anode where silicon powder is roughly milled with graphite by dry milling. (Col. 5, ll. 30-64.)

#### ANALYSIS

We confine our discussion to appealed claim 1, which contains claim limitations representative of the arguments made by Appellants pursuant to 37 C.F.R. § 41.37(c)(1)(vii).

*Issue 1*

We agree with the Examiner that claim 1 contains product-by-process language. As recited in claim 1, the structural characteristic of the composite material is that the base material is physically bonded to the carbonaceous material by van der Waals forces. The physical bonding is a result of the process of applying the compressive force and shearing force to at least a part of the surface of a base material when the composite material is formed. (See FF 1.) Therefore, Appellants' argument that the characteristic of the physical bonding "exists, that is it is effected, because a compressive force and a shearing force has been applied" (App. Br. 7) is consistent with the Examiner's position that claims recite product-by-process language. Thus, claim 1 clearly contains product-by-process language.

*Issue 2*

Appellants' arguments that Kawakami, Suzuki '672, and Suzuki '725 do not disclose the distinctive structural characteristics as claimed are unconvincing. Although Appellants contend that Kawakami, Suzuki '672, and Suzuki '725 fail to disclose application of a compressive force and a shearing force, Appellants have not addressed the Examiner's findings that Kawakami, Suzuki '672, and Suzuki '725 inherently disclose the recited physical bonding by virtue of mixing of the base material and carbonaceous material with application of compressive and shearing forces in a ball mill, a vibration mill, or by rough milling, respectively. (Ans. 4, 5, and 8; FF 4-6.)

While Appellants contend that conventional composite materials do not exhibit the improved cycle characteristics obtained as a result of the recited physical bonding, Appellants' Specification does not set forth the required amounts of compressive and shearing forces needed to produce the

van der Waals forces physically bonding the base material and carbonaceous material. (FF 3.) In addition, the improved cycle characteristics of the product are due to the van der Waals forces physically bonding the base material and carbonaceous material. (FF 1, 2.) Appellants have not provided sufficient evidence that the mixing techniques disclosed in Kawakami, Suzuki '672, and Suzuki '725 correspond to the "simple mixing" techniques distinguished in the Specification (FF 2) and would be insufficient to produce the physical bonding recited in the claims or the improved cycle characteristics argued by Appellants. (*See* Ans. 7-8.)

Thus, we agree with the Examiner that Kawakami, Suzuki '672, and Suzuki '725 anticipate claim 1.

However, the Examiner's rejection of claims 1-12 over Inoue stands on different footing. The Examiner stated that "Inoue does not explicitly state a compressive and/or shearing force is applied to the negative electrode material," further stating that the "negative electrode material of the claimed invention and the negative electrode of the prior art appear to be the same." (Ans. 6.) Thus, the Examiner appears to be relying solely on the use of similar materials in Inoue as basis for the rejection. In this case, the Examiner fails to provide sufficient evidence to support the position that the composite material disclosed in Inoue includes a base material physically bonded by van der Waals forces to a carbonaceous material. Accordingly, there is insufficient basis to find that the composite material disclosed in Inoue anticipates the present claims. Furthermore, the Examiner's rejection under 35 USC § 103(a) does not provide any further finding or reasoning that would lead us to conclude that the claimed anode material would have been obvious over Inoue.



DECISION

We affirm the Examiner's § 102(b)/103 rejections of claims 1-12 as being anticipated by, and alternatively obvious over Kawakami, Suzuki '672, and Suzuki '725.

We reverse, however, the Examiner's § 102(e)/103 rejections of claims 1-12 as being anticipated by, and alternatively obvious over Inoue.

TIME PERIOD

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1) (2009).

ORDER

AFFIRMED

rvb

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